

$D^*(2010)^\pm$

$$I(J^P) = \frac{1}{2}(1^-)$$

I, J, P need confirmation.

NODE=M062

$D^*(2010)^\pm$ MASS

The fit includes $D^\pm, D^0, D_s^\pm, D^{*\pm}, D^{*0}, D_s^{*\pm}, D_1(2420)^0, D_2^*(2460)^0$,
and $D_{s1}(2536)^\pm$ mass and mass difference measurements.

NODE=M062M

NODE=M062M

VALUE (MeV)	DOCUMENT ID	TECN	CHG	COMMENT
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NODE=M062M

2010.29±0.13 OUR FIT

NEW

[2010.28 ± 0.13 MeV OUR 2012 FIT]

● ● ● We do not use the following data for averages, fits, limits, etc. ● ● ●

2008 ± 3	¹ GOLDHABER 77	MRK1	±	$e^+ e^-$
2008.6 ± 1.0	² PERUZZI 77	LGW	±	$e^+ e^-$

¹ From simultaneous fit to $D^*(2010)^+, D^*(2007)^0, D^+$, and D^0 ; not independent of FELDMAN 77B mass difference below.

NODE=M062M;LINKAGE=G

² PERUZZI 77 mass not independent of FELDMAN 77B mass difference below and PERUZZI 77 D^0 mass value.

NODE=M062M;LINKAGE=P

$m_{D^*(2010)^+} - m_{D^+}$

NODE=M062MD

The fit includes $D^\pm, D^0, D_s^\pm, D^{*\pm}, D^{*0}, D_s^{*\pm}, D_1(2420)^0, D_2^*(2460)^0$,
and $D_{s1}(2536)^\pm$ mass and mass difference measurements.

NODE=M062MD

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
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NODE=M062MD

140.66±0.10 OUR FIT

Error includes scale factor of 1.1.

140.64±0.08±0.06

620 BORTOLETTO92B CLE2 $e^+ e^- \rightarrow$ hadrons

$m_{D^*(2010)^+} - m_{D^0}$

NODE=M062DM

The fit includes $D^\pm, D^0, D_s^\pm, D^{*\pm}, D^{*0}, D_s^{*\pm}, D_1(2420)^0, D_2^*(2460)^0$,
and $D_{s1}(2536)^\pm$ mass and mass difference measurements.

NODE=M062DM

VALUE (MeV)	EVTS	DOCUMENT ID	TECN	COMMENT
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NODE=M062DM

145.421±0.010 OUR FIT

Error includes scale factor of 1.1.

145.421±0.010 OUR AVERAGE

145.412±0.002±0.012		ANASTASSOV 02	CLE2	$D^{*\pm} \rightarrow D^0 \pi^\pm \rightarrow (K\pi) \pi^\pm$
145.54 ± 0.08	611	³ ADINOLFI 99	BEAT	$D^{*\pm} \rightarrow D^0 \pi^\pm$
145.45 ± 0.02		³ BREITWEG 99	ZEUS	$D^{*\pm} \rightarrow D^0 \pi^\pm \rightarrow (K\pi) \pi^\pm$
145.42 ± 0.05		³ BREITWEG 99	ZEUS	$D^{*\pm} \rightarrow D^0 \pi^\pm \rightarrow (K^- 3\pi) \pi^\pm$
145.5 ± 0.15	103	⁴ ADLOFF 97B	H1	$D^{*\pm} \rightarrow D^0 \pi^\pm$
145.44 ± 0.08	152	⁴ BREITWEG 97	ZEUS	$D^{*\pm} \rightarrow D^0 \pi^\pm,$
145.42 ± 0.11	199	⁴ BREITWEG 97	ZEUS	$D^{*\pm} \rightarrow D^0 \pi^\pm,$ $D^0 \rightarrow K^- 3\pi$
145.4 ± 0.2	48	⁴ DERRICK 95	ZEUS	$D^{*\pm} \rightarrow D^0 \pi^\pm,$ $D^0 \rightarrow K^- \pi^+$
145.39 ± 0.06 ± 0.03		BARLAG 92B	ACCM	$\pi^- 230$ GeV
145.5 ± 0.2	115	⁴ ALEXANDER 91B	OPAL	$D^{*\pm} \rightarrow D^0 \pi^\pm$
145.30 ± 0.06		⁴ DECAMP 91J	ALEP	$D^{*\pm} \rightarrow D^0 \pi^\pm$
145.40 ± 0.05 ± 0.10		ABACHI 88B	HRS	$D^{*\pm} \rightarrow D^0 \pi^\pm$
145.46 ± 0.07 ± 0.03		ALBRECHT 85F	ARG	$D^{*\pm} \rightarrow D^0 \pi^+$
145.5 ± 0.3	28	BAILEY 83	SPEC	$D^{*\pm} \rightarrow D^0 \pi^\pm$
145.5 ± 0.3	60	FITCH 81	SPEC	$\pi^- A$
145.3 ± 0.5	30	FELDMAN 77B	MRK1	$D^{*+} \rightarrow D^0 \pi^+$

OCCUR=2

OCCUR=2

OCCUR=2

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145.44 ± 0.09	122	⁴ BREITWEG 97B	ZEUS	$D^{*\pm} \rightarrow D^0 \pi^\pm,$ $D^0 \rightarrow K^- \pi^+$
145.8 ± 1.5	16	AHLEN 83	HRS	$D^{*+} \rightarrow D^0 \pi^+$
145.1 ± 1.8	12	BAILEY 83	SPEC	$D^{*\pm} \rightarrow D^0 \pi^\pm$
145.1 ± 0.5	14	BAILEY 83	SPEC	$D^{*\pm} \rightarrow D^0 \pi^\pm$
145.5 ± 0.5	14	YELTON 82	MRK2	29 $e^+ e^- \rightarrow K^- \pi^+$
~ 145.5		AVERY 80	SPEC	γA
145.2 ± 0.6	2	BLIETSCHAU 79	BEBC	νp

OCCUR=3

³Statistical errors only.⁴Systematic error not evaluated.NODE=M062DM;LINKAGE=AV
NODE=M062DM;LINKAGE=A

$$m_{D^*(2010)^+} = m_{D^*(2007)^0}$$

NODE=M062EM

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
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NODE=M062EM

• • • We do not use the following data for averages, fits, limits, etc. • • •

2.6 ± 1.8 ⁵ PERUZZI 77 LGW e⁺ e⁻⁵Not independent of FELDMAN 77B mass difference above, PERUZZI 77 D⁰ mass, and GOLDHABER 77 D*(2007)⁰ mass.

NODE=M062EM;LINKAGE=P

D*(2010)[±] WIDTH

NODE=M062W

VALUE (keV)	CL%	EVTs	DOCUMENT ID	TECN	COMMENT
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NODE=M062W

96 ± 4 ± 22 ANASTASSOV 02 CLE2 D*[±] → D⁰ π[±] → (K π) π[±]

• • • We do not use the following data for averages, fits, limits, etc. • • •

<131 90 110 BARLAG 92B ACCM π⁻ 230 GeV

D*(2010)[±] DECAY MODES

NODE=M062225;NODE=M062

D*(2010)⁻ modes are charge conjugates of the modes below.

NODE=M062

Mode	Fraction (Γ _i /Γ)
Γ ₁ D ⁰ π ⁺	(67.7 ± 0.5) %
Γ ₂ D ⁺ π ⁰	(30.7 ± 0.5) %
Γ ₃ D ⁺ γ	(1.6 ± 0.4) %

DESIG=1

DESIG=3

DESIG=2

CONSTRAINED FIT INFORMATION

An overall fit to 3 branching ratios uses 6 measurements and one constraint to determine 3 parameters. The overall fit has a $\chi^2 = 0.3$ for 4 degrees of freedom.

The following *off-diagonal* array elements are the correlation coefficients $\langle \delta x_i \delta x_j \rangle / (\delta x_i \cdot \delta x_j)$, in percent, from the fit to the branching fractions, $x_i \equiv \Gamma_i / \Gamma_{\text{total}}$. The fit constrains the x_i whose labels appear in this array to sum to one.

$$\begin{array}{c|cc} x_2 & -62 & \\ x_3 & -43 & -44 \\ \hline & x_1 & x_2 \end{array}$$

D*(2010)⁺ BRANCHING RATIOS

NODE=M062230

Γ(D ⁰ π ⁺)/Γ _{total}	DOCUMENT ID	TECN	COMMENT	Γ ₁ /Γ
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NODE=M062R1
NODE=M062R1**0.677 ± 0.005 OUR FIT****0.677 ± 0.006 OUR AVERAGE**

0.6759 ± 0.0029 ± 0.0064	^{6,7,8} BARTELT	98	CLE2	e ⁺ e ⁻
0.688 ± 0.024 ± 0.013	ALBRECHT	95F	ARG	e ⁺ e ⁻ → hadrons
0.681 ± 0.010 ± 0.013	⁶ BUTLER	92	CLE2	e ⁺ e ⁻ → hadrons

• • • We do not use the following data for averages, fits, limits, etc. • • •

0.57 ± 0.04 ± 0.04 ADLER 88D MRK3 e⁺ e⁻0.44 ± 0.10 COLES 82 MRK2 e⁺ e⁻0.6 ± 0.15 ⁸ GOLDHABER 77 MRK1 e⁺ e⁻

$\Gamma(D^+\pi^0)/\Gamma_{\text{total}}$					Γ_2/Γ
VALUE	EVTS	DOCUMENT ID	TECN	COMMENT	
0.307 ± 0.005 OUR FIT					
0.3073 ± 0.0013 ± 0.0062					
	6,7,8	BARTELT	98	CLE2	e^+e^-
• • • We do not use the following data for averages, fits, limits, etc. • • •					
0.312 ± 0.011 ± 0.008	1404	ALBRECHT	95F	ARG	$e^+e^- \rightarrow$ hadrons
0.308 ± 0.004 ± 0.008	410	⁶ BUTLER	92	CLE2	$e^+e^- \rightarrow$ hadrons
0.26 ± 0.02 ± 0.02		ADLER	88D	MRK3	e^+e^-
0.34 ± 0.07		COLES	82	MRK2	e^+e^-

NODE=M062R3
 NODE=M062R3

$\Gamma(D^+\gamma)/\Gamma_{\text{total}}$					Γ_3/Γ
VALUE	CL%	EVTS	DOCUMENT ID	TECN	COMMENT
0.016 ± 0.004 OUR FIT					
0.016 ± 0.005 OUR AVERAGE					
0.0168 ± 0.0042 ± 0.0029			6,7	BARTELT	98 CLE2 e^+e^-
0.011 ± 0.014 ± 0.016		12	⁶	BUTLER	92 CLE2 $e^+e^- \rightarrow$ hadrons
• • • We do not use the following data for averages, fits, limits, etc. • • •					
<0.052		90		ALBRECHT	95F ARG $e^+e^- \rightarrow$ hadrons
0.17 ± 0.05 ± 0.05				ADLER	88D MRK3 e^+e^-
0.22 ± 0.12			⁹	COLES	82 MRK2 e^+e^-

NODE=M062R2
 NODE=M062R2

⁶ The branching ratios are not independent, they have been constrained by the authors to sum to 100%.

NODE=M062R;LINKAGE=A

⁷ Systematic error includes theoretical error on the prediction of the ratio of hadronic modes.

NODE=M062R;LINKAGE=B

⁸ Assuming that isospin is conserved in the decay.

NODE=M062R;LINKAGE=G

⁹ Not independent of $\Gamma(D^0\pi^+)/\Gamma_{\text{total}}$ and $\Gamma(D^+\pi^0)/\Gamma_{\text{total}}$ measurement.

NODE=M062R;LINKAGE=C

$D^*(2010)^\pm$ REFERENCES

ANASTASSOV 02	PR D65 032003	A. Anastassov <i>et al.</i>	(CLEO Collab.)	REFID=48550
ADINOLFI 99	NP B547 3	M. Adinolfi <i>et al.</i>	(Beatrice Collab.)	REFID=46925
BREITWEG 99	EPJ C6 67	J. Breitweg <i>et al.</i>	(ZEUS Collab.)	REFID=46604
BARTELT 98	PRL 80 3919	J. Bartelt <i>et al.</i>	(CLEO Collab.)	REFID=46349
ADLOFF 97B	ZPHY C72 593	C. Adloff <i>et al.</i>	(H1 Collab.)	REFID=45421
BREITWEG 97	PL B401 192	J. Breitweg <i>et al.</i>	(ZEUS Collab.)	REFID=45520
BREITWEG 97B	PL B407 402	J. Breitweg <i>et al.</i>	(ZEUS Collab.)	REFID=45699
ALBRECHT 95F	ZPHY C66 63	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=44374
DERRICK 95	PL B349 225	M. Derrick <i>et al.</i>	(ZEUS Collab.)	REFID=44373
BARLAG 92B	PL B278 480	S. Barlag <i>et al.</i>	(ACCMOR Collab.)	REFID=42174
BORTOLETTO 92B	PRL 69 2046	D. Bortoletto <i>et al.</i>	(CLEO Collab.)	REFID=43116
BUTLER 92	PRL 69 2041	F. Butler <i>et al.</i>	(CLEO Collab.)	REFID=43170
ALEXANDER 91B	PL B262 341	G. Alexander <i>et al.</i>	(OPAL Collab.)	REFID=41553
DECAMP 91J	PL B266 218	D. Decamp <i>et al.</i>	(ALEPH Collab.)	REFID=41614
ABACHI 88B	PL B212 533	S. Abachi <i>et al.</i>	(ANL, IND, MICH, PURD+)	REFID=40584
ADLER 88D	PL B208 152	J. Adler <i>et al.</i>	(Mark III Collab.)	REFID=40579
ALBRECHT 85F	PL 150B 235	H. Albrecht <i>et al.</i>	(ARGUS Collab.)	REFID=11527
AHLEN 83	PRL 51 1147	S.P. Ahlen <i>et al.</i>	(ANL, IND, LBL+)	REFID=22868
BAILEY 83	PL 132B 230	R. Bailey <i>et al.</i>	(AMST, BRIS, CERN, CRAC+)	REFID=22870
COLES 82	PR D26 2190	M.W. Coles <i>et al.</i>	(LBL, SLAC)	REFID=22866
YELTON 82	PRL 49 430	J.M. Yelton <i>et al.</i>	(SLAC, LBL, UCB+)	REFID=22867
FITCH 81	PRL 46 761	V.L. Fitch <i>et al.</i>	(PRIN, SAFL, TORI+)	REFID=22863
AVERY 80	PRL 44 1309	P. Avery <i>et al.</i>	(ILL, FNAL, COLU)	REFID=11498
BLIETSCHAU 79	PL 86B 108	J. Blietschau <i>et al.</i>	(AACH3, BONN, CERN+)	REFID=22861
FELDMAN 77B	PRL 38 1313	G.J. Feldman <i>et al.</i>	(Mark I Collab.)	REFID=22858
GOLDHABER 77	PL 69B 503	G. Goldhaber <i>et al.</i>	(Mark I Collab.)	REFID=11434
PERUZZI 77	PRL 39 1301	I. Peruzzi <i>et al.</i>	(LGW Collab.)	REFID=11435

NODE=M062